In the Claims

Amendments to the Claims:

Claim 1 (canceled)

2. (previously presented) The method of claim 35 wherein the substrate is employed within a microelectronic fabrication selected from the group consisting of integrated circuit microelectronic fabrications, ceramic substrate microelectronic fabrications, solar cell optoelectronic microelectronic fabrications, sensor image array optoelectronic microelectronic fabrications and display image array optoelectronic microelectronic fabrications.

3. (previously presented) The method of claim 35 wherein the silicon layer is selected from the group consisting of monocrystalline silicon layers, polycrystalline silicon layers and amorphous silicon layers.

4. (previously presented) The method of claim 35 wherein:

upon etching, the silicon layer is masked with a mask layer, and

the mask layer is selected from the group consisting of silicon containing dielectric hard mask layers and photoresist mask layers.

5. (previously presented) The method of claim 35 wherein the seasoning polymer layer is formed of a material selected from the group consisting of:

silicon and bromine containing seasoning polymer materials;

silicon, bromine and oxygen containing seasoning polymer materials;

silicon and chlorine containing seasoning polymer materials;

silicon, chlorine and oxygen containing seasoning polymer materials;

silicon, bromine and chlorine containing seasoning polymer materials; and

silicon, bromine, chlorine and oxygen containing seasoning polymer materials.

Claims 6 and 7 (canceled)

8. (previously presented) The method of claim 36 wherein the substrate is employed within a microelectronic fabrication selected from the group consisting of integrated circuit microelectronic fabrications, ceramic substrate microelectronic fabrications, solar cell optoelectronic microelectronic fabrications, sensor image array optoelectronic microelectronic fabrications and display image array optoelectronic microelectronic fabrications.

9. (previously presented) The method of claim 36 wherein:

upon etching, the first monocrystalline silicon layer is masked with a mask layer; and

the mask layer is selected from the group consisting of silicon containing dielectric hard mask layers and photoresist mask layers.

10. (previously presented) The method of claim 36 wherein the seasoning polymer layer is formed of a material selected from the group consisting of:

silicon and bromine containing seasoning polymer materials;

silicon, bromine and oxygen containing seasoning polymer materials;

silicon and chlorine containing seasoning polymer materials;

silicon, chlorine and oxygen containing seasoning polymer materials;

silicon, bromine and chlorine containing seasoning polymer materials; and

silicon, bromine, chlorine and oxygen containing seasoning polymer materials.

Claims 11 and 12 (canceled)

13. (previously presented) The method of claim 37 wherein the substrate is employed within a microelectronic fabrication selected from the group consisting of integrated circuit microelectronic fabrications, ceramic substrate microelectronic fabrications, solar cell optoelectronic microelectronic fabrications, sensor image array

optoelectronic microelectronic fabrications and display image array optoelectronic microelectronic fabrications.

14. (previously presented) The method of claim 37 wherein:

upon etching, the polycrystalline silicon layer is masked with a mask layer; and

the mask layer is selected from the group consisting of silicon containing dielectric hard mask layers and photoresist mask layers.

15. (previously presented) The method of claim 37 wherein the seasoning polymer layer is formed of a material selected from the group consisting of:

silicon and bromine containing seasoning polymer materials;

silicon, bromine and oxygen containing seasoning polymer materials;

silicon and chlorine containing seasoning polymer materials;

silicon, chlorine and oxygen containing seasoning polymer materials;

silicon, bromine and chlorine containing seasoning polymer materials; and

silicon, bromine, chlorine and oxygen containing seasoning polymer materials.

Claims 16 to 18 (canceled)

Claim 19 (canceled)

Claims 20 and 21 (canceled)

22. (previously presented) The method of claim 35, wherein the seasoned plasma reactor chamber cleaning step, when using an eight inch diameter substrate, employs:

a seasoned plasma reactor chamber pressure of from about 50 to 500mTorr;

a source radio frequency power of from about 100 to 200 watts at a source radio frequency of from about 2 to 13.56 MHz and a bias power of up to about 500 watts;

a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a nitrogen trifluoride or a sulfur hexafluoride flow rate of from about 10 to 500 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss.

Claims 23 and 24 (canceled)

Claim 25 (canceled)

Claims 26 and 27 (canceled)

28. (previously presented) The method of claim 36, wherein the seasoned plasma reactor chamber cleaning step, when using an eight inch diameter substrate, employs:

a seasoned plasma reactor chamber pressure of from about 50 to 500mTorr;

a source radio frequency power of from about 100 to 200 watts at a source radio frequency of from about 2 to 13.56 MHz and a bias power of up to about 500 watts;

a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a nitrogen trifluoride or a sulfur hexafluoride flow rate of from about 10 to 500 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss.

Claims 29 and 30 (canceled)

Claim 31 (canceled)

Claims 32 and 33 (canceled)

34. (previously presented) The method of claim 37, wherein the seasoned plasma reactor chamber cleaning step, when using an eight inch diameter substrate, employs:

a seasoned plasma reactor chamber pressure of from about 50 to 500mTorr;

a source radio frequency power of from about 100 to 200 watts at a source radio frequency of from about 2 to 13.56 MHz and a bias power of up to about 500 watts;

a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a nitrogen trifluoride or a sulfur hexafluoride flow rate of from about 10 to 500 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss.

35. (currently amended) A method for forming an etched silicon layer comprising:

providing a first substrate having formed thereover a first silicon layer;

etching the first silicon layer to form an etched first silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation

provides at least one of an active bromine containing etchant species and an active chlorine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing:

(a) a silicon containing seasoning polymer layer forming gas; and

(b) a bromine and/or chlorine containing etchant gas;

(2) the first silicon layer is etched to form the etched first silicon layer within the seasoned plasma reactor chamber; wherein the first silicon layer etch step, when using an eight inch diameter substrate, employs:

a reactor chamber pressure of from about 1 to 500 mTorr;

a radio frequency source power of from about 10 to 2000 watts at a source radio frequency of from about 2 to 13.56 MHz and an external bias power of up to about 500 watts;

a substrate temperature and a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a bromine and/or chlorine containing etchant gas flow rate of from about 10 to 200 sccm;

an oxygen flow rate of from about 1 to 50 sccm;

a nitrogen trifluoride flow rate of from about 1 to 50 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first silicon layer to form the etched first silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second silicon layer to form an etched second silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

36. (currently amended) A method for forming an etched monocrystalline silicon layer comprising:

providing a first substrate having formed thereover a first monocrystalline silicon layer;

etching the first monocrystalline silicon layer to form an etched first monocrystalline silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides at least one of an active bromine containing etchant species and an active chlorine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing:

(a) a silicon containing seasoning polymer layer forming gas; and

(b) a bromine and/or chlorine containing etchant gas;

(2) the first monocrystalline silicon layer is etched to form the etched first monocrystalline silicon layer within the seasoned plasma reactor chamber; wherein the first monocrystalline silicon layer etch step, when using an eight inch diameter substrate, employs:

a reactor chamber pressure of from about 1 to 500 mTorr;

a radio frequency source power of from about 10 to 2000 watts at a source radio frequency of from about 2 to 13.56 MHz and an external bias power of up to about 500 watts;

a substrate temperature and a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a bromine and/or chlorine containing etchant gas flow rate of from about 10 to 200 sccm;

an oxygen flow rate of from about 1 to 50 sccm;

a nitrogen trifluoride flow rate of from about 1 to 50 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first monocrystalline silicon layer to form the etched first monocrystalline silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second monocrystalline silicon layer to form an etched second monocrystalline silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

37. (currently amended) A method for forming an etched polycrystalline silicon layer comprising:

providing a first substrate having formed thereover a first polycrystalline silicon layer;

etching the first polycrystalline silicon layer to form an etched first polycrystalline silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides an active bromine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing:

(a) a silicon containing seasoning polymer layer forming gas; and

(b) a bromine and/or chlorine containing etchant gas;

(2) the first polycrystalline silicon layer is etched to form the etched first polycrystalline silicon layer within the seasoned plasma reactor chamber; wherein the first polycrystalline silicon layer etch step, when using an eight inch diameter substrate, employs:

a reactor chamber pressure of from about 1 to 500 mTorr;

a radio frequency source power of from about 10 to 2000 watts at a source radio frequency of from about 2 to 13.56 MHz and an external bias power of up to about 500 watts;

a substrate temperature and a seasoned plasma reactor chamber temperature of from about 20 to 200°C;

a hydrogen bromide flow rate of from about 10 to 200 sccm;

an oxygen flow rate of from about 1 to 50 sccm;

a nitrogen trifluoride flow rate of from about 1 to 50 sccm;

a backside cooling gas pressure of from about 1 to 50 torr and a flow rate of from about 2 to 50 sccm; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first polycrystalline silicon layer to form the etched first polycrystalline silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second polycrystalline silicon layer to form an etched second polycrystalline silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

38. (previously presented) The method of claim 35, wherein the first monocrystalline silicon layer etch step, when using an eight inch diameter substrate, employs a hydrogen bromide flow rate of from about 10 to 200 sccm.

39. (previously presented) The method of claim 35, wherein the first monocrystalline silicon layer etch step, when using an eight inch diameter substrate, employs a hydrogen bromide flow rate of from about 10 to 200 sccm.

40. (new) A method for forming an etched silicon layer comprising:

providing a first substrate having formed thereover a first silicon layer;

etching the first silicon layer to form an etched first silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides at least one of an active bromine containing etchant species and an active chlorine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing:

(a) a silicon containing seasoning polymer layer forming gas; and

(b) a bromine and/or chlorine containing etchant gas;

(2) the first silicon layer is etched to form the etched first silicon layer within the seasoned plasma reactor chamber; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first silicon layer to form the etched first silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second silicon layer to form an etched second silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

41. (new) A method for forming an etched monocrystalline silicon layer comprising:

providing a first substrate having formed thereover a first monocrystalline silicon layer;

etching the first monocrystalline silicon layer to form an etched first monocrystalline silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides at least one of an active bromine containing etchant species and an active chlorine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing:

(a) a silicon containing seasoning polymer layer forming gas; and

(b) a bromine and/or chlorine containing etchant gas;

(2) the first monocrystalline silicon layer is etched to form the etched first monocrystalline silicon layer within the seasoned plasma reactor chamber; and

a magnetic field of up to about 200 gauss; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first monocrystalline silicon layer to form the etched first monocrystalline silicon layer

within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second monocrystalline silicon layer to form an etched second monocrystalline silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).

42. (new) A method for forming an etched polycrystalline silicon layer comprising:

providing a first substrate having formed thereover a first polycrystalline silicon layer;

etching the first polycrystalline silicon layer to form an etched first polycrystalline silicon layer while employing a plasma etch method employing a plasma reactor chamber in conjunction with a plasma etchant gas composition which upon plasma activation provides an active bromine containing etchant species, wherein within the plasma etch method:

(1) a cleaned plasma reactor chamber is seasoned to provide a seasoned plasma reactor chamber having a seasoning polymer layer formed therein; wherein the seasoning method is a waferless seasoning method employing:

(a) a silicon containing seasoning polymer layer forming gas;

and

(b) a bromine and/or chlorine containing etchant gas;

(2) the first polycrystalline silicon layer is etched to form the etched first polycrystalline silicon layer within the seasoned plasma reactor chamber; and

(3) the seasoning polymer layer is cleaned from the seasoned plasma reactor chamber to provide the cleaned plasma reactor chamber after etching the first polycrystalline silicon layer to form the etched first polycrystalline silicon layer within the seasoned plasma reactor chamber prior to etching a second substrate having formed thereover a second polycrystalline silicon layer to form an etched second polycrystalline silicon layer formed over the second substrate within the plasma reactor chamber while employing the plasma etch method in accord with (1), (2) and (3).